

Renewable Energy Potential on Marginal Lands in the United States

Collaborators: Stanford University (PI – Chris Field; Elliott Campbell)
National Renewable Energy Laboratory (PI – Anelia Milbrandt; Donna Heimiller)

Project Description

Marginal lands have received increased attention as an alternative to valuable land for renewable energy installations. However, the term “marginal land” has been used quite loosely, without a concrete definition, and the extent and characteristics of these lands have not been systematically assessed. This project intends to define and identify the marginal lands in the United States, as well as assess their renewable energy potential. The researchers will integrate and analyze various environmental data and apply geospatial techniques using state-of-the-art geographic information systems (GIS). The project aims to provide policy makers and industry developers with a better understanding of the marginal lands availability in the country and thus guide their future strategic decisions.

Accomplishments and Current Status

Marginal, idle, degraded, abandoned, underutilized, wasteland...are all names used to describe lands that are currently not in use. The authors are working on defining marginal lands – conducting a detailed literature review and holding discussions on the topic with relevant agencies. Collection of data to support the geospatial analysis is also ongoing. An example of datasets that are being collected include EPA's Brownfield and Superfund sites, abandoned mines, abandoned agricultural lands, Conservation Reserve Program (CRP) lands, deserts, etc.

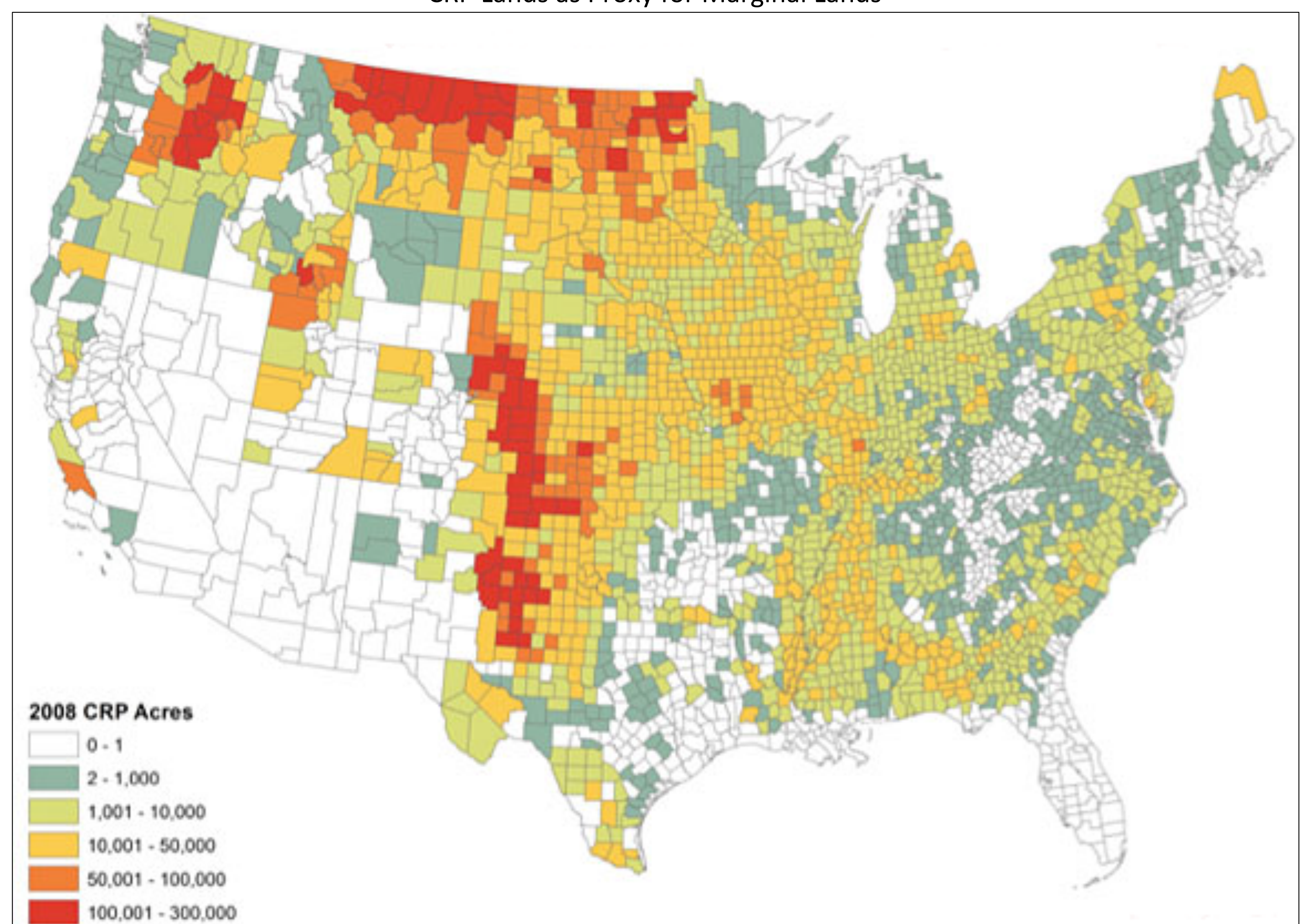


Abandoned Mine in Montana



Source: USGS

CRP Lands as Proxy for Marginal Lands



Source: LBL

Next Steps

Once information on the location and extent of marginal lands is collected, the team will examine main characteristics of these lands and evaluate their renewable energy potential. Available data on wind, solar, geothermal, and hydro will be overlaid to determine the availability of these resources within the marginal land boundaries. A Crop Productivity Model, developed by Stanford University, will be used to assess the lands' general suitability for growing crops. The results of this analysis will then be compared with yield data obtained from trials on specific bioenergy crops, such as switchgrass (*Panicum virgatum*) and miscanthus (*Miscanthus x giganteus*), to determine the potential for growing dedicated energy crops on these lands.

Expected Outcomes and Applications

This will be the first comprehensive study of marginal lands in the United States. It will provide the renewable energy industry with much needed information on the location and characteristics of these lands which could lead to new development opportunities. The results of this study will be included in the Bioenergy Atlas (<http://maps.nrel.gov/bioenergyatlas>) and other geospatial tools that need this information. It will also be made available on OpenEI (<http://en.openei.org>) to reach a broader audience interested in potential siting of renewable energy technologies.